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Formation of The Creative Activity of Students on The Basis of Educational Experiment in Physics

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Abstract

Social and economic transformations occurring in Republic of Kazakhstan put forward new requirements to system of school education which consist of preparation learning youth for independent creative development of knowledge, formation of skills to investigate: design, project, and experiment in training-cognitive activity. In this connection the problem of formation creative activity of pupils, as well as role and place of educational experiment in pedagogical process of comprehensive school should be counted actual.

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1. Introduction

The formation of society is impossible without a working and creative thinking people. As well as all the advanced countries the Republic of Kazakhstan needs capable and creative individuals. In this context, the problem of formation of the students' creative activity in the pedagogical process of secondary school is relevant and meaningful. The aim of this study is to develop a theoretical basis and method of forming the creative activity of students through the use of educational experiment, test its effectiveness and training of scientific advice. Methodological and theoretical basis of the study are the theory of personality, theory of activity, theory of values.

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Scientific novelty and theoretical significance of the research:

- The concept of "the formation of creative activity of students through the use of educational experiment" is identified;
- Opportunities of educational experiment in the formation of the creative activity of students are identified;
- Structurally meaningful model of the creative activity of students through the use of educational experiment in physics is designed;
- Training complex formation of the creative activity of students through the use of educational experiment is developed.

The following provisions have been researched in the course of the study:

1. The theoretical basis for the formation of creative activity of students through the use of educational experiment in secondary schools should be substantiated methodological approaches to the problem at clarifying the content of key terms "formation of the creative activity of students" and "learning experiment."
2. The possibility of formation of the creative activity of students through the use of educational experiment in school types are defined by the gradual complication of the school experiment, the use of innovative technologies in the educational process for the formation of the creative activity of students through the use of educational experiment ; oriented educational process at school on the effective organization of independent creative activity of students promoting the development of research skills .
3. Theoretical and structurally meaningful model of the creative activity of students through the use of educational experiment in the school has the unity of motivational, cognitive-content, activity-oriented components, criteria, indicators and levels.
4. The results of the experimental work confirm the effectiveness of our developed methodology.

Humanity is interested in the problem of creativity from ancient times. Philosophical consideration of creativity is defined as the product of a new one. The problem of creativity and the creative personality is represented in science and widely studied by many sciences: philosophy, sociology, psychology, pedagogy, physics, mathematics, computer science, etc.

The notion of "creativity" in teaching encyclopedia in the following terms: "Creativity - the activity that generates something qualitatively new and different uniqueness, originality socio-historical uniqueness".

In the process of learning physics is necessary to take into account the distinctive features of the concepts of "activity" and "creativity." Activity may be due to external or internal causes, and work spontaneously, without proper planning. The activity is suitable, arbitrary, rational, and objective in the work is not important, the creativity result is lateral.

Vygotsky calls this creative activity, "which creates something new, it will be whether it is something known to the outside world, or the construction of the mind or feelings of living and is found only in the person". Building on the research of scientists considering work as an activity we associate creative activities not only objectively new discoveries, but also with the decision of daily living tasks. Consideration of creativity in terms of not only getting a new result, but the process allows to obtain this result suggests the possibility of weapons of human ways of creativity.

2. Discussion

Theoretical analysis of the literature allows us to consider the problem from the perspective of the relation of creativity and intelligence, as an independent factor that is independent of intelligence, but is associated with divergent thinking, as an activity. The creative ability of students is the ability to independently enter and navigate the situations, to make independent decisions and to look for new ways to address to achieve the result.

Formation of creativity is a specially organized training and its design and implementation, ensuring the development of the student's personality and self-development. Methods of teaching physics as a source of innovation processes, looking for ways of understanding and realization of the humanistic educational paradigms and methods of formation of creative abilities of students:

- a creative approach in choosing the learning objectives;
- giving students the choice of the type of work;
- the applicability of the relationship of physical concepts, laws and theories;
- pupil-independent approach to fulfillment and research;
- individual selection of material to suit the creative abilities of students;
- identification and registration of inclinations and preferences of the student;
- the creation of a creative environment, taking into account the personality of each student;
- activation of value orientations of the individual.

Creative activity - an activity that results in acts objectively or subjectively new product that has personal and public importance. We consider creativity as a process that ensures the development of personal potential.

Stand out as the inherent creativity of the following characteristics:

- Social and personal significance;
- The presence of a problem situation, creative problem;
- The presence of subjective conditions (personality, motivation);
- The novelty of the result.

An important condition for the formation of the creative activity of students is the account of the three stages of work:

- first phase - the emergence of a creative situation;
- second - the heuristic;
- third - the stage of completion.

Dedicated steps in the scientific literature are detailed in the links of the creative process:

- A clash with the new - paradoxically, in which the question is formulated, there is a creative difficulty;
- Creative uncertainty, hidden job (at the beginning of the third link, the first stage of the creative process);
- Eureka (realized strategy to address the problem, the idea, the concept, which requires defining and developing solutions);
- Criticism, confirmation, the incarnation - this is the stage of completion, which uses logical and emotional, imaginative, aesthetic and practical criteria (at this stage, the expression in the result).

Physics - is an intellectual science, but - still the determining factor in the development of creative abilities of students is not only the content and methods of its implementation. The value of physics in school education is determined by the role of physical science in modern society, its impact on the pace of development of scientific and technological progress in general. In the educational process in physics in high school to identify the levels of development of creative abilities of students using traditional techniques needed to make the educational process in physics. In teaching physics problem is one of practical, hands- on labs, tests and experiments. Teacher interested in working creatively with non-standard and non-traditional methods. Study knowledge differs from scientific, primarily because of the novelty of knowledge is subjective, it is significant only for the knowing subject - the student. Choosing a teacher of appropriate methods , techniques , teaching is carried out taking into account the shortest way of student learning , the most rational combination , in terms of learning objectives , theoretical knowledge and experimental induction and deduction , logical and intuitive conclusions in their dialectical unity. In the process of learning - both in the content and in the techniques and methodology is influenced by the process of knowledge (through knowledge of the methodology and teaching methods). It helps to understand the logic and methods of knowledge of appropriate teaching methods, and establish a methodical transition from one stage of the process of learning to another formula for the cycle of knowledge (facts - a hypothesis - theoretical implications - experiment). The essence of the method of the research is to provide a teacher of the search, the creative activity of students to solve new problems and problematic tasks. The purpose of this method is a complete assimilation of students experience in creative activities.

The steps of:

- Observation of facts and events;
- The study of the facts and phenomena;
- Clarification of unexplained phenomena to be investigated (production problems);

- Hypotheses;
- Construction of a research plan;
- Implementation of the plan, which consists in determining relationships of the phenomenon with others;
- Formulation of solutions, explanations;
- Verification of solutions;
- Practical implications of the possible and the need to apply the knowledge gained.

Demonstration experiment refers to the empirical exemplary methods of teaching and is a component of the physical training of the experiment and is a reproduction of the physical phenomena in the teacher demonstration table with special physical devices. Physics refers to the number of science, experimental method which occupies a central position. The use of educational experiment not only promotes the formation of a high-quality subject knowledge, but also the development of practical, general science skills of students, in particular : the ability to design an experiment , hypothesize work with laboratory equipment, take readings, process the results of experiments and competently execute them. The experimental method in the teaching of physics in high school is one of the main methods of teaching physics. The demonstration of the method in the science of physics is important, so it is large in teaching physics in the training school subject “physics”.

Physical experiment in high school used in the following ways:

- Demonstration experiment that conducts a teacher;
- Frontal laboratory work performed by students in the study of program material;
- Physical practical work performed by students in the completion of the previous section, the physics course or at the end of the school physics course;
- Experimental tasks;
- After-school physical experiments (for mugs, conferences) and homemade experimental work.

A specificity of the demonstration method in its visibility, credibility and effectiveness in teaching.

In the practice of the school has created the following forms and methods of organizing and forming creative abilities of students in the application of physics experiments in the teaching of physics:

- explanation teacher of practical application of physical laws and phenomena;
- demonstration of the operating principles of machines and technical installations;
- demonstration of audio and video with the physical and technical material;
- laboratory and practical work front , the content of which is the study and use of facilities, equipment, etc.;
- creativity in organizations of independent observations, construction, engineering (in the classroom, at home);
- familiarizing students for creative work in the private circles ;
- organization and conduct of classroom and extracurricular reading of scientific literature in the school;
- elective courses in applied physics.

3. Conclusion

The demonstration experiment is a means of visibility, the organization promotes students' perception of educational material , his understanding and memory , implementation of creative activity of students; allows polytechnic student learning , helps increase interest in the study of physics and the creation of learning motivation. An important component is the ability to self-teaching students to be creative. In summary, we can say that the work - an activity whose product is something new, original, never-before-the former, it can be a thing of the material or spiritual world, a way of activity, knowledge, and the like as the subject's own creativity, as well as other people. Scientists have identified the following types of work: scientific, philosophical, cultural, industrial, technical, inventive, political, organizational, artistic, pedagogical, methodological, mythological, household, etc.

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